

REMARKS

Claim 1, 5, 6, and 8 were pending in this Office Action. The present response does not cancel or add any claims, and it is claims 1, 5, 6, and 8 which are presently at issue.

The Office Action

In the Office Action mailed December 1, 2006, claims 1 and 6 were rejected on the ground of non-statutory obviousness-type double patenting as being unpatentable over claim 9 of Applicant's 6,274,257 patent. Claims 1, 6, and 8 were rejected under 35 U.S.C. 102 as being anticipated by U.S. Patent No. 6,274,257.

Claims 1, 6, and 8 were rejected under 35 U.S.C. 103 as being unpatentable over U.S. Patent No. 6,293,075 of Ajayi et al. taken in view of U.S. Patent No. 6,640,779 of Thiagarajan. Claim 5 was rejected under 35 U.S.C. 103 as being unpatentable over the '075 and '779 patents taken further in view of U.S. Patent No. 2,558,286 of Albertson.

Applicant thanks the Examiner for the further search, the thorough explanation of the basis of the rejections, and for the withdrawal of certain of the other, previously made rejections.

The Double Patenting Rejection

Claims 1 and 6 were rejected on the grounds of non-statutory obviousness type-double patenting as being unpatentable over claim 9 of U.S. Patent No. 6,274,357. Applicant respectfully submits that this rejection is inappropriate.

The Manual Patent Examining Procedure (MPEP) in section 804B 1 sets forth the threshold standard for an obviousness type-double patenting rejection: "... the first question to be asked is –

does any claim in the application define an invention that is anticipated by, or is merely an obvious variation of an invention claimed in the patent?"

Under this Standard, the Obviousness Type-Double Patenting Rejection is Inappropriate.

Claim 9 of the cited '257 patent depends on claim 1. Claim 1 is directed to a forming member for shaping a reactive metal. As recited in the specification, the '257 patent, the forming member may be a die, mold, or the like which contacts molten metal and operates to shape that metal. Claim 1 goes on to recite that the forming surface of the forming member has a coating of doped chromium nitride thereupon, and as detailed in the specification, the purpose of this coating is to prevent corrosion of the forming member by a caustic molten metal such as aluminum. Claim 9, which is cited in the rejection, specifically recites that the forming member is a die casting mold. In contrast, the claims presently at issue are all directed to a piston pin having a doped chromium nitride coating thereupon. Clearly, claims in the '257 patent and the pending application are directed to very different items, namely dies for contacting molten metals, and piston pins. Furthermore, the purpose of the coating in the '257 patent is for preventing corrosion of the die surface, while the purpose of the coating in the present application is for preventing wear.

It is clearly set forth in the MPEP at section 804B 1 that the inquiry with regard to obviousness type-double patenting is the same as the inquiry for any rejection under 35 U.S.C. 103. In view thereof, it is clear that this rejection is inappropriate. there is no teaching of suggestion to be gleaned from the claims of the '257 patent (or the specification for that matter) which would suggest to one of skill in the art that the subject matter and the claims at issue, namely providing piston pins with a doped chromium nitride coating to prevent wear, is desirable or possible. The only teaching that could be gleaned from the claims of the '257 patent is that doped chromium nitride coatings can

function to prevent corrosion by molten metals in dies and other metal-forming apparatus. Therefore, the obviousness type-double patenting rejection is inappropriate. Reconsideration and withdrawal thereof is respectfully requested.

The Rejection under 35 U.S.C. 102

Claims 1, 6, and 8 were rejected under 35 U.S.C. 102 as being anticipated by U.S. Patent No. 6,274,257. Applicant respectfully submits that this rejection is without merit.

As discussed above, the '257 patent teaches that doped chromium nitride is effective as a coating for preventing corrosion or erosion of dies and other metal-shaping apparatus by caustic molten metals such as aluminum. As such, the sole teaching is directed to preventing corrosion in members for shaping reactive metals. There is no teaching relating to piston pins or other engine components.

In formulating this rejection, the Examiner points to the fact that in the examples given in the '257 patent, cylindrical steel pins were coated with doped chromium nitride. The Examiner further opines that that these pins could be used as piston pins, and asserts that they would be capable for performing the intended use as piston pins, as recited in the claims at issue. All of the supposition is without any support, and is contrary to the teaching in the '257 patent. The pins in the '257 patent were cylindrical steel pins which were used as substrates for experimental coatings. In one group of experiments, the coatings were deposited on flat-steel coupons, so that the hardness of the coating could be evaluated (in this regard, see column 4, lines 35-64, for example). In a second series of experiments, the coatings were applied to cylindrical pins which were immersed into molten aluminum and rotated so as to simulate die molding conditions. (See column 4, lines 14-30) The

reason cylindrical pins were employed was so that they could be readily immersed into molten aluminum and rotated. In both instances, the shape of the substrates was dictated by the nature of the tests being carried out. There is no teaching or suggestion in the '257 patent which would lead one to understand that the chromium nitride coating could be incorporated into components of a motor vehicle engine, much less piston pins. There is no teaching or suggestion that the cylindrical pins used for the aluminum tests could in any way function as piston pins. The only commonality they have with piston pins is that they generally cylindrical.

All teaching in the '257 patent is to the need to prevent corrosion by molten aluminum and like reactive metals in a casting process, and to the fact that chromium nitride coatings can provide this corrosion resistance. There is no teaching regarding utility of chromium nitride as a wear-resistant coating for engine components. And, given the fact that one of skill in the art would understand that engine components are not exposed to molten reactive metals such as aluminum in a normal intended use, such a skilled artisan would not look to teaching regarding prevention of corrosion by reactive metals for any teaching regarding increase in the wear resistance of engine components.

The '257 patent in no way makes obvious the presently claimed invention. It is not at all directed to engine components, nor is it directed to preventing wear in such components. The teaching of the '257 patent is to prevention of corrosion occasioned by contact of forming members with molten metals such as aluminum. This teaching cannot suggest the presently claimed invention. As mentioned above, the '257 patent is not at all concerned with engine components or preventing wear. The sole teaching therein is of preventing corrosion occasioned not by wear but by molten reactive metals. As such, the '257 patent is directed to an invention very different from that of the present patent application; hence, one of skill in the art would not find any teaching therein which is

relevant to or would lead to the principals of the present invention. Therefore, any possible rejection of the claims at issue under 35 U.S.C. 103 in view of the '257 patent is likewise inappropriate.

The Rejections under 35 U.S.C. 103

Claims 1, 6, and 8 were rejected under 35 U.S.C. 103 as being unpatentable over U.S. Patent No. 6,213,075 of Ajayi et al. taken in view of U.S. Patent No. 6,640,779 of Thiyagarajan. (On page 4 of the Office Action, claim 21 is also referenced as being rejected under these two references. Applicant presumes that this reference is in error, given the fact that claim 21 has been canceled.)

All the claims at issue include the limitation that the claimed piston pin has a coating comprising doped chromium nitride. In formulating the rejection, the Examiner cites to the '779 patent for the teaching that a piston pin of a motor vehicle is a load-bearing part of an engine and that improved lubrication or reduced friction and diminution of wear is desirable therein. The Examiner acknowledges that the '779 patent does not show the use of a doped chromium nitride coating for reducing wear in engine components. However, it is the Examiner's assertion that the '075 patent teaches that doped chromium nitride can be used as a wear-resistant coating in engine components; and that in view thereof, it would be obvious to incorporate such a coating in the teaching of the '779 patent so as to approximate the presently claimed invention.

Applicant respectfully submits that this conclusion is erroneous for the reason that the '075 patent does not teach the use of doped chromium nitride. While the Examiner asserts that the '075 patent shows doped chromium nitride coatings, Applicant respectfully submits that no such teaching is to be found in the '075 patent. The '075 patent does teach a number of hard coatings which are

used in an engine and these various coatings, as detailed for example at column 2, lines 45 and following, include chromium nitride; there is no teaching that the chromium nitride is doped.

The Examiner's sole basis for asserting that doped chromium nitride is taught in the '075 patent is based upon a Markush grouping in claim 1 wherein it is specified that: "said hard coating is selected from a group of CrN, Cr₂N, TiN, DLC, and mixtures thereof." Since the Markush grouping refers to chromium nitride as well as other materials which can be used in a mixture with chromium nitride, the Examiner is asserting that this listing teaches the use of doped chromium nitride. Applicant respectfully disagrees. A doped material is very different from a mixture of materials. Doping is a term of art which refers to a material having typically relatively small amounts of a second material incorporated into its matrix. As a result of this substitution, the matrix properties of the material including properties such as hardness, corrosion resistance, electronic properties, thermoconductivity, and the like, are significantly changed. A mixture, on the other hand, can be various aggregations of materials without regard to electronic and matrix effects. In fact, the other members of the Markush grouping, mainly TiN and DLC (diamond-like carbon) cannot function as dopants for chromium nitride, since they are molecular compounds and cannot insert into the chrome-nitrogen matrix of the chromium nitride. Therefore, these materials cannot possibly dope chromium nitride and any mixture of chromium nitride and either DLC or TiN cannot in any way be considered to be a doped chromium nitride. In view thereof, Applicant respectfully submits that this rejection under 35 U.S.C. 103 is inappropriate.

Claim 5 was further rejected under 35 U.S.C. 103 over the afore-described '075 and '779 patents taken further in view of U.S. Patent No. 2,558,286 of Albertson. The '286 patent was cited solely for its teaching of the polishing of coatings. In view of the general inapplicability of the base rejection, this rejection is likewise inappropriate.

In view of the foregoing, Applicant respectfully submits that the rejection under 35 U.S.C. 103 is without merit, since the prior art does not in any way show or suggest that doped chromium nitride may be utilized as a wear-resistant coating in any component of a motor vehicle engine much less a piston pin. Reconsideration and withdrawal thereof is respectfully requested.

Conclusion

Applicant respectfully submits that this application is in condition for allowance. Any questions, comments, or suggestions which the Examiner may have which would place the application in still better condition for allowance should be directed to the undersigned attorney.

Dated: March 1, 2007

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